

Math for Teaching: Fraction Meanings

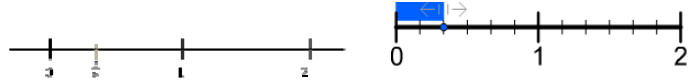
A fraction is a number, which can tell us about the relationship between two quantities. These two quantities provide information about the parts and the whole. Defining the whole is important when working with fractions. Fractions are used to represent a variety of relationships.

Relationships

The fraction $\frac{2}{6}$ can represent one or more of the following, depending on the context.

- a **linear measure** (read ‘two-sixths’).

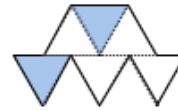
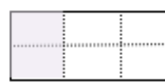
- The number is defined by its distance from 0.



- a **part-whole relationship** (read ‘two-sixths’) which is based upon a *relative measure* or a *set*:

Continuous

- *two-dimensional measures*, such as an area or region, where an equal part is an equal area.
- *three-dimensional measures*, such as capacity or mass, where an equal part is an equal capacity or mass.



Discrete

- *sets*, such as a collection of objects, where an equal part is an item in the set and equal parts are not necessarily identical. Attributes (e.g., colour, size, shape) may or may not be considered. For example, colour is important for the first set but not in the second two. Parts can be organized in an array, randomly, or in composite sets.



- a **part-part relationship** (read ‘two to six’).

- The parts are equivalent with respect to one attribute (not necessarily size). Ratio is frequently used for part to part relationships.

One-dimensional measure example:
2 cm to 6 cm

Two-dimensional measure example:
2 equal areas shaded to 6 equal areas unshaded

Set example:
2 apples to 6 bananas

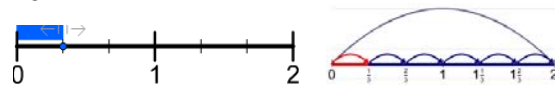
Actions

The fraction $\frac{2}{6}$ can also represent

- a **quotient**

- $\frac{a}{b} = a$ divided by b

$\frac{2}{6}$ is 2 partitioned into 6 equal parts



- an **operator**

- $\frac{a}{b}$ of a quantity (the whole)
The whole is assumed to be the quantity being multiplied by $\frac{a}{b}$. The fraction acts as a transformer by either enlarging or shrinking the operand.

Two-dimensional measure example:
 $\frac{2}{6}$ of the area of the floor

Set example:
 $\frac{2}{6}$ of the people in the room

When a fraction appears in a numerical expression (e.g., $\frac{2}{3} + \frac{4}{5}$) it is assumed to represent a part to whole relationship. In this case, since a fraction represents a single numerical value, the properties of number operations apply.

See the Fractions Digital Paper references document for source information at www.edugains.ca.